

## EE 231 Laboratory

**Instructors:** Andrew Ronquillo – aronquil@nmt.edu  
David Breen – dbreen@nmt.edu

**Office:** Workman 196

**Office Hours:** Mon and Wed 10:00 – 11:00am

**Website:** [http://www.ee.nmt.edu/%7Eerives/231L\\_11/EE231L.html](http://www.ee.nmt.edu/%7Eerives/231L_11/EE231L.html)

### **Purpose**

This lab will introduce you to the operations of the DE0-NANO FPGA. You will learn how to load programs onto the FPGA utilizing the Quartus II development environment.

### **Materials**

Bound lab book (not a spiral)  
DE0-NANO FPGA  
Safety Goggles  
Wiring Kit  
Black Pen

### **Requirements**

Before coming to the scheduled lab time, the prelab MUST be completed. You will need to keep a complete lab book while in the lab. There will be a final report due at the end of the semester, that will include a project done while in the lab. SAFETLY GLASSES MUST BE WORN AT ALL TIMES IN THE LAB.

### **Completion Deadlines and Grading Policies**

- Prelabs are due at the beginning of your lab session. If your prelab is not turned in at the beginning of lab it will not be graded and you will receive a zero for that prelab.
- Lab books are due 2 days after your lab section at 3pm.
- Programs written for the lab must be signed off by lab instructor to confirm it is working or 50% will be deducted from lab book grade.
- Reports are due one week after completion of lab at the beginning of lab. A reduction of one letter grade per day will be taken off for late reports.

### **Grade Breakdown**

Each lab will be graded out of 10 points. 7 points are allocated for the prelab and 3 points are allocated for the lab.

There will also be two typed write-ups during the semester. These will be based on your lab book and must be written using only your lab book. Each of these will be worth the same as a lab grade.

## **Lab Book**

The lab book is your record of what you have done in the lab. This is an important tool used to keep track during a project as well as relay specific information. The lab book is used to keep a log of all problems and interesting issues encountered when working. This book will be your main resource when writing reports and describing what you are doing to any interested parties. The general rule of thumb for maintaining a good lab book is that you or any other engineer should be able to repeat the lab with the exact same results by only using your lab book with no outside resources or help.

## **Lab Book Outline**

Include Table of Contents  
Purpose  
Setup Diagram (block diagram)  
Introduction  
Procedure  
Results/Questions  
Pseudocode and Code (commented)  
Discussion/Conclusion

## **Formal Reports**

A formal report is what you may experience in a design project in your later classes or while being employed. These reports are often a project deliverable that is required by the client before the contract is satisfied. The report should convey the status of the project in a manner that is readable by people of a non-engineering background (i.e. your boss). These reports should be complete and honest about your work. Do not convey any false or misleading information.

## **Report Outline**

Abstract  
Introduction/Overview  
Design Approach  
Description of Subsystems  
Results  
Conclusion

## **Report Guidelines**

12pt. professional type font, single-spaced  
Include title page (title, name, class, lab session, date)  
Numbered pages  
Center all figures and number them with captions  
Title each section of the report

## **Academic Honesty**

All students are expected to demonstrate personal integrity. Collaboration with other students is strongly encouraged, however each student *must show his/her individual effort*. Exchange of information such as lab solutions/code from each other is strictly prohibited. Students exhibiting

any form of academic dishonesty will be subject to penalties in accordance with NMT policies. Refer to the academic honesty policy in your student handbook.